Atlantic Coast Pipeline – Buckingham Compressor Station Air Permit Briefing

Virginia Department of Environmental Quality

Air and Renewable Energy Division

Buckingham County, Virginia

August 16, 2018

DEQ

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Agenda

- Meeting Purpose and Format
- Air Permit Program Overview
- Application Background
- Emission Units at the Site
- Best Available Control Technology (BACT) – Unit by Unit, Pollutant by Pollutant, State of the Art
- Air Quality Analysis (Modeling) – Protecting Human Health
- Public Comments, Hearing, Board Consideration
- Q&A

Purpose of Information Briefing

- Explain the air permitting process to assist the public's ability to provide meaningful comments on the draft air permit
- Provide an overview of the DEQ draft air permit determination
- Provide an opportunity for public to ask questions
- Comments and questions discussed tonight **WILL NOT** be considered as formal comments and **WILL NOT** be part of the formal record

Meeting Format

- DEQ will explain the air permitting process and review the BCS draft permit
- After the presentation, DEQ will take questions from the audience
- Questions will be taken one at a time to allow everyone a chance to speak
- Please be respectful - Everyone is here to learn and to gain a better understanding of the process

Air Permit Process - Overview

- Source determines activity and location
- Siting of a facility is the responsibility of the Local Government – Zoning
- Source completes an application for a permit to construct and operate
- DEQ processes application for regulatory compliance

Air Permit Process – DEQ Review

- DEQ reviews application
  - Reviews type and quantity of pollutants emitted
  - Determines what federal and state regulations may apply
  - Reviews Best Available Control Technology
  - Reviews any necessary air quality analysis – Including approving a modeling protocol prior to any modeling being submitted

Air Permit Process – DEQ Review (cont'd)

- DEQ reviews application
  - Ensures monitoring, recordkeeping and reporting to assure compliance
- DEQ drafts permit documents
  - Holds public comment period if required
  - Holds public hearing if required

BCS Application Background

- Application initially received in 2015
  - FERC process requires early submittal
- Local Government Approval (Buckingham County Board of Supervisors Special Permit) - February 2017
- Application substantially updated in 2017
- DEQ requested clarifications and updates – July 2018 final submittal – Application determined to be complete

Compressor Turbines

- Burn Natural Gas with air
- Hot air pushes through blades to spin shaft
- Rotation of shaft turns compressor fan blades
- Fan blades push natural gas down the pipe

Turbine Operations

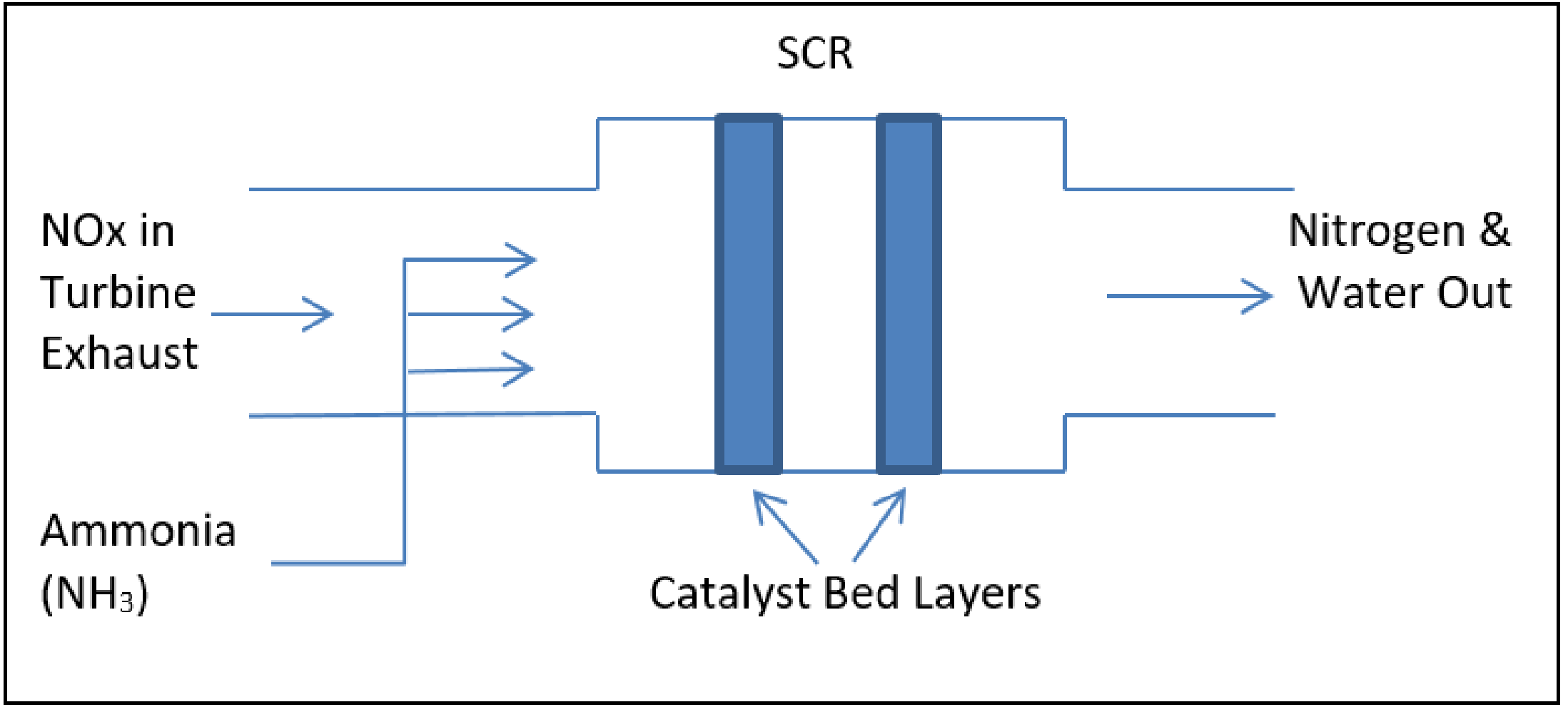
- Burning Natural Gas creates by-products of combustion
  - Mainly nitrogen oxides (NOx) and carbon monoxide (CO)
  - Particulates (PM10, PM2.5), volatile organic compounds (VOC) and formaldehyde are emitted in smaller quantities

- Routine Operations
  - Startup
  - Shutdown
  - Less than 0^{o}F
  - Steady-State (normal)

Control Technology Overview

- NOx – Selective Catalytic Reduction (SCR)
- CO, VOC, Formaldehyde – Oxidation catalyst
- A catalyst changes time and temperature range of reaction
- SCR – Adds ammonia to the stream to react with NOx

SCR Overview



BACT - Turbines

- The proposed air permit does not specify a control efficiency for the SCR or the oxidation catalyst, but requires an emission standard of **3.75 ppm NOx, 2 ppm CO, and 1.25 ppm VOC**.

- **Performance testing** ensures that the emission standards are met, and establishes the flow rate of ammonia**.**

- On-going monitoring of temperatures and ammonia flowrate

Natural Gas Emissions

- Natural gas contains:
  - Volatile organic compounds (2.6%)
  - Hexane (0.16%)
  - Methane (88%)

- Natural gas is emitted by the following mechanisms:
  - Equipment Leaks
  - Emissions from line cleaning operations – pigging
  - Emissions from start-up and shutdown of compressor turbines
  - Emissions from emergency system testing

Equipment Leaks

- Piping connection points
  - Valves
  - Pumps
  - Flanges

- Minimize by on-going inspection and repair
  - Leak detection and repair (LDAR)

BACT - Equipment Leaks

- Daily Audio, Visual, Olfactory (AVO)
- Quarterly Leak Detection and Repair Survey
  - Uses camera to see leaks

- https://www.youtube.com/watch?v=62SEYQ5ecKI

- Fix leaks as quickly as possible – Potential penalties if leaks are not fixed within a specified timeframe

BACT - Pigging operations

- Pig – essentially squeegee style operation
- Uses natural gas pressure to push
- Pig pushes any liquids to collection point
- Emissions from putting the pig in the pipe (launching) and taking it out (receiving)
- Minimize number of events

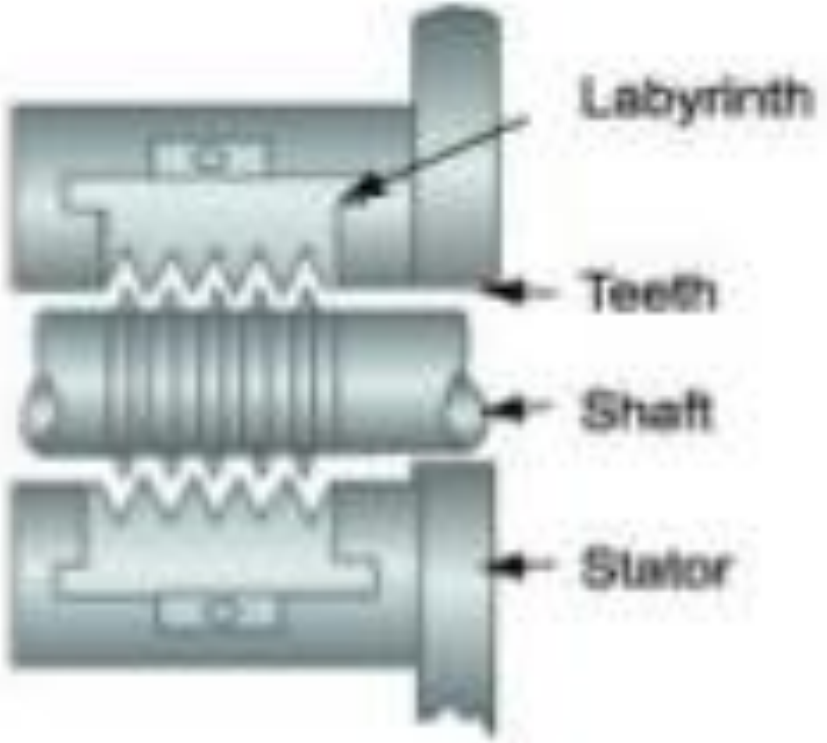
Compressor Start-up and Shutdown

- Turbines do not run continuously
- Work on compressor may require opening of piping
- If turbine shutdown dry seals usually stop operating
- Shutdown venting requires start-up purge to get rid of oxygen

Compressor Case

BACT – Compressor Start-up and Shutdown

- Use Vent Gas Reduction System (VGRS)



BACT – Compressor Start-up and Shutdown (cont'd)

- Minimize Number of Vented Shutdowns
- Minimize Pressure in Compressor Case
- On-going monitoring of VGRS pressures

BACT - Emergency Shutdown System Testing

- Test of System for Emergency Situations
- Opening emergency valve during test vents natural gas
- Testing required once per year (PHMSA)

- “Capping” blocks pipe after the emergency valve
- Tests valve with little vented natural gas

BACT COMPARISON

Pollutant/Process	Buckingham Proposed	Buckingham	West Virginia	North Carolina
NOx	5 ppm	3.75 ppm	5 ppm	25 ppm
CO	5 ppm	2 ppm	5 ppm	No limit
VOC	1.25 ppm	1.25 ppm	1.25 ppm	No limit
ESD Methane	2,012 tpy (CO_2e)	0.125 tpy (CO_2e)	No limit	No limit
ESD VOC	2.4 tpy	0.00016 tpy	No limit	No limit
ESD Hexane	0.2 tpy	0.00001 tpy	No limit	No limit
SU/SD Methane	52,195 tpy (CO_2e)	216 tpy (CO_2e)	4,950 tpy (CO_2e)	No limit
SU/SD VOC	61.5 tpy	0.3 tpy	5.8 tpy	No limit
SU/SD Hexane	3.8 tpy	0.02 tpy	0.36 tpy	No limit

Air Quality Analysis - Modeling

- National Ambient Air Quality Standards (NAAQS)
  - Health-based Concentrations
  - Rules for Entire United States

- A variety of averaging times depending on pollutants
  - As short as 1 hour
  - As long as 1 year

- Buckingham currently meets all standards

Modeling Results

- Background values are based on measured air concentrations
  - Higher population
  - Higher emissions from vehicles and other sources

- Emissions from BCS
  - Worst-case emissions
  - Analyzed multiple operational scenarios
  - Dependent on pollutant and averaging time

Modeling Results (cont'd)

- The following NAAQS were modeled following EPA procedures:
  - 1-hour NO_2
  - Annual NO_2
  - 1-hour CO
  - 8-hour CO
  - 24-hour PM2.5
  - Annual PM2.5
  - 24-hour PM10
  - 8-hour ozone
- All results are less than the applicable NAAQS

Air Toxics Air Quality Analysis

- Virginia Regulation for “toxic pollutants”
- Significant Ambient Air Concentration (SAAC)
  - Health-based standard
  - 1-hour and annual standards
  - Dependent on pollutant impact

- Emissions from BCS
  - Worst-case emissions
  - Analyzed multiple operational scenarios

Air Toxics Modeling Results

- The following standards were modeled:
  - 1-hour formaldehyde
  - Annual formaldehyde
  - 1-hour hexane

- Modeled impacts are less than SAAC

Purpose of Public Comment Period

- Provide an opportunity for interested parties to comment on the draft air permit

- Refine and improve draft air permit documents as necessary based on information received during comment period

- Ensure air permit properly implements all applicable regulatory requirements and meets all federal and state air quality standards

Air Pollution Control Board Consideration

- Director has determined permit will be directly considered by the Board
- Public hearing is **NOT** a meeting of the Board – a Board member will be serving as the Hearing Officer
- Board will take final action at a meeting to be scheduled in late October/early November timeframe – Date will be announced as soon as available
- Board will take into consideration all documents associated with the permit including the response to comments document prepared by DEQ based on comments received during the 30-day comment period and public hearing

Steps before Board Consideration

- Public Comment Period - Comments received between August 8th and September 11th including comments at the public hearing
- DEQ reviews, considers, and responds to all public comments
- DEQ makes any necessary changes to permit documents
- DEQ proposes final draft permit to Board
- Public commenters may address Board
  - **No new information may be presented at the meeting**
  - **Only people who comment during the formal comment period may provide comment at the Board meeting**
- Board will take final action

Q&A Reminders

- Purpose is to gain a better understanding of the process
- Questions should pertain to the air quality permit
- Questions will be taken one at a time to allow everyone a chance to speak
- Comments and questions discussed tonight **WILL NOT** be considered as formal comments and **WILL NOT** be part of the formal record